THERMAL PRINTING MECHANISM

USER'S MANUAL

A620 & A621

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1. GENERAL DESCRIPTION

The A620 and A621 are versatile Clamshell (Easy paper loading) thermal printers, designed for desktop or portable use.
By following the guide lines in this manual and with careful handling, a long and reliable operating life can be expected from these printers.
Please note that portable versions that include batteries are provided with unloaded batteries for safety and storage reasons.

1.1. Main Features

! International character set.
! Automatic power-off features.
! User selectable options stored in non-volatile RAM.
! Automatic power up from data line activity.
! Built-in tab stops.
! Self-test facility.
! Graphics.
! Reset command.
! Diagnostic Mode.
! Emulation Choice : see chapter "Order Code".
! Bar Code Printing.
! User defined character set.

1.2. SPECIFICATIONS

FEATURE	VALUE / COMMENT	UNIT
Printing method	Static thermal dot line printing	-
Number of resistor dots	384	-
Resolution	8	Dots/mm
Printing width	48	mm
Paper width	58 ± 0.1	mm
Character Fonts	16 x 24 dots. (24 columns) or 9 x 24 (40 columns)	-
Interface	RS232 Serial.	-
Buffer	8 minimum	K bytes
Printing Speed	12	character lines / sec*
Height	72	mm
Width	108	mm
Depth	147	mm
Weight	425 611 (With battery)	g
Operating Temperature	0 to 50	°C
Storage Temperature	-20 to 50	°C
Operating humidity	10 to 85	% RH (Non-Condensing)
Storage humidity	10 to 90	% RH (Non-Condensing)
Electrical Reliability	50	million head pulses per dot
Mechanical Reliability (abrasion resistance)	50	Km

* When the number of Dots "ON" is < 30 %. Otherwise the multi-heat mode is activated and 4 heats will be performed. This mode causes a decreasing printing speed.

Battery models :

External, replaceable battery pack, Duracell DR10 or GP VD151.
Text can be printed continuously for approximately 20,000 lines when the batteries are fully charged.
It will take 14 hours (without printing) to totally charge the battery via the printer.
As an example after ½ hour charging, the printer can print 1 meter of paper (270 text lines with the test used).
A power saving feature automatically switches the printer off when the interface has not been used for a 1 or 5 minute (programmable) period.
A continuous power-on option is available.

Power supplies :

For desktop models, without batteries, a supply of 9 Vdc. is required. The current rating of the supply will depend on the print duty (More black print - more current) but typically a 9v supply at 3A will suffice for most applications.

Emi and Safety

CE mark
FCC class B
C-tick for Australia
UL
cUL / CSA

Vibration

Sinusoidal vibration tests
The standard used for this test was : IEC68-2-6
5-9 Hz, 6 mm displacement
9-200 Hz, 1g of accélération.
1 octave / minute
12 cycles per axis
3 axes
Printer unpacked and operating

Random vibration tests
The standard used for this test was : IEC 68-2-36
5-200 Hz, DSP : 0.01 g2/Hz
200-500 Hz, DSP : 0.03 g2/Hz.
mean acceleration : 1.7 g
Duration : 30min per axis
3 axes
Printer unpacked and operating

Shake vibration tests
The standard used for this test was : IEC 68-2-29
Wave : half sinusoidal
Acceleration : 15 g
Duration : 6 min
6 axes (±OX, ±OY, ±OZ)

Drop test

The printer is packed.
1 meter on concrete
1 meter on wood

1.3. Order Code

A6 printer is available in many variants.
The table below shows the valid product codes which are used to described each version.

This chapter give the meaning of each digit of the full product name.
It can help you to know the characteristics of your mechanism.

All versions proposed in this chapter are not necessarily available. If you are looking for one of those : once you have determined your need, contact your sales representative to make sure the needed version is available (or in which conditions it could be created).

Digits description **:** **A62 <x2> <x3> <x4< <x5> <x6>**

Application
x2 = 0 : Desktop
x2 = 1 : Portable
x2 = 2 : Label

Interface and software configuration
x3 =

Emulation	RS232	Centronics	IrDA	RF
ESC POS / Citizen 560 / Compatible DP 1200	**0**	**1**	**2**	**3**
ESC POS second receipt management	**4**	**5**	**6**	**7**
Verifone P250	**A**	**B**	**C**	**D**

Specific fonts
x4 = 0 : Standard Font
x4 = K : Kanji Font

Board configuration
x5 = 0 : Standard board configuration (Hitachi Microprocessor)
x5 = N : New board configuration (ST10 microprocessor)

note : There is a different power supply with the new board configuration.

Power supply
x6 = B : With battery
x6 = R : With battery and rubber boot
x6 = 0 : Without power supply
x6 = E : European Power supply
x6 = U : US Power supply
x6 = G : UK Power supply
x6 = J : Japanese Power supply
x6 = A : Australian Power supply

1.4. Warranty

The supplied printers are guaranteed for a period of 12 (twelve) months beginning at the date of delivery (ex-works).

The printers are guaranteed against defective material and/or workmanship. The warranty covers solely, and at Axiohm's choice, the cost of repair or replacement by Axiohm in its factory, after restitution by the customer, of the printers admitted by AXIOHM to be defective, and excluding assembling, dismounting, shipping and other expenses.

The implementation of the warranty will not extend the warranty period.

Due to the complexity of the electronic and mechanical techniques used in the operation of such a printer, AXIOHM does not warranty particular results for its installation out of the published specifications.

This warranty is subject to strict compliance with AXIOHM's technical instructions for installation, use and maintenance.

In particular, this warranty will not be valid for any defects due to:

- Use of thermal papers other than those recommended by AXIOHM
- Incorrect maintenance
- Defective installation or modification not approved by AXIOHM
- Non-compliance, during any period, with the specified working conditions including the electrical power supply specifications
- Abnormal wear or mechanical damage, including dot burning due to power overloads
- transportation in packaging other than the type of carton / foam insert in which the printer was originally shipped

Any transportation, storage or setting up which does not comply with the technical specifications given to the customer by AXIOHM, or its official distributor, will invalidate this warranty.

In no event shall AXIOHM assume any liability in excess of that defined above. It is agreed that AXIOHM will not be liable for any indemnity for accidents to persons, damage to property or for loss of earnings.

2. INSTALLATION / SET-UP

2.1. YOUR PRINTER

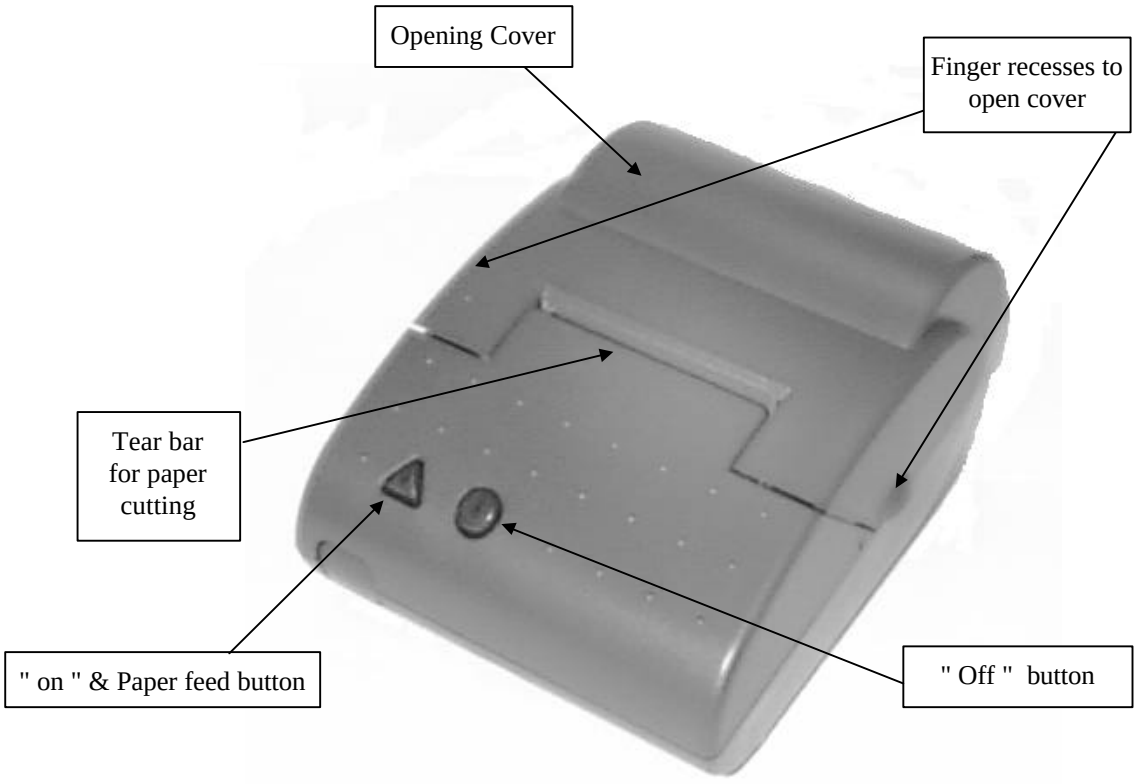
2.1.1. Package

The packing box contains :

- Printer
- Power supply for A620 versions (except A6200000) with connecting cables to the printer and to the power network.
- Battery for A621000B versions (except A6210000)
- Paper roll
- Set Up Guide

2.1.2. General description

The A620 & A621 are complete printers designed with the clamshell easy paper loading system.
A620 series are desktop printer versions, A621 are portable versions that cannot be used while connected to a power supply for battery loading.



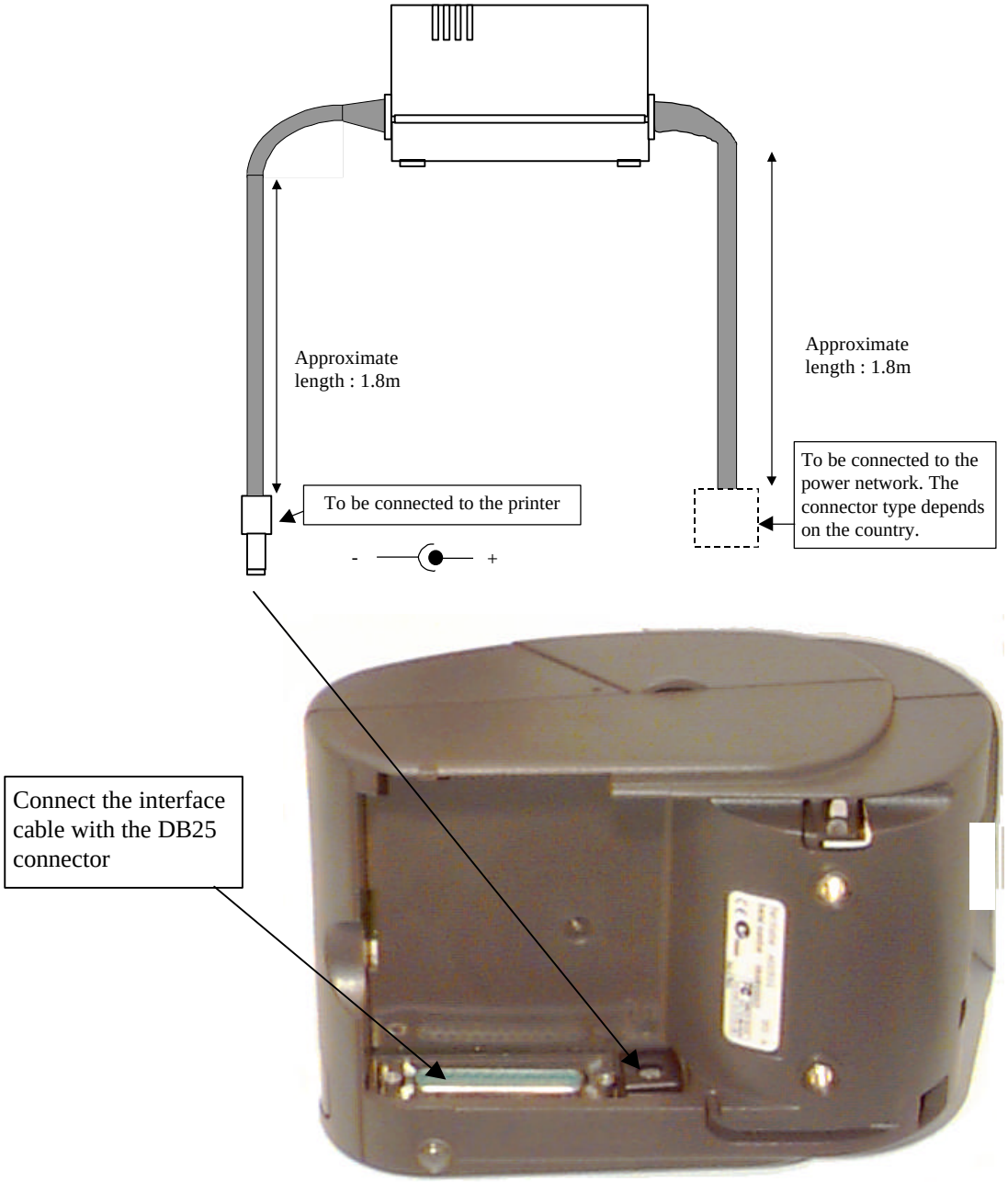
2.1.3. Printer location

The printer should be set on a stable holder (for desktop versions) in a place where the following conditions are achieved :

- temperature from 0 to 50°C for operating (- 20 to 50 for storage)
- no risk of water, grease or dust exposure
- No mechanical stress
- It is recommended to avoid the mechanical vibrations
- When using the power adapter avoid using a mains outlet which also supplies heavy switching machinery since a noisy supply may impair printer operation.

2.2. PLUGGING & CONNECTING YOUR PRINTER

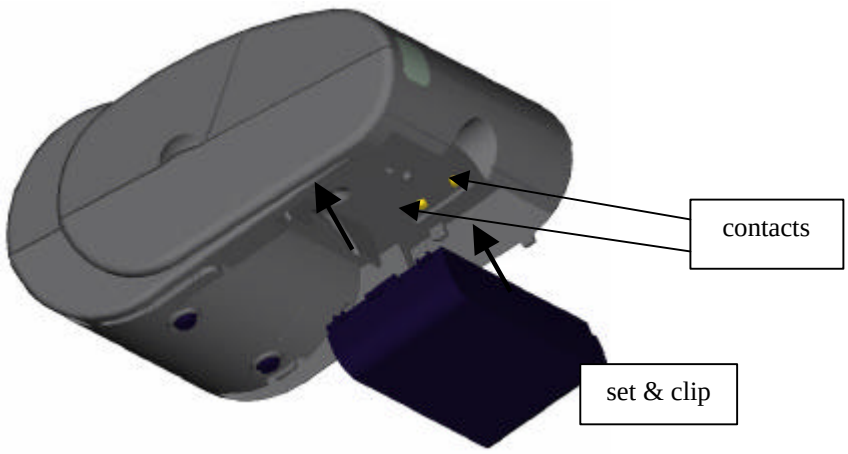
2.2.1. Connecting the power supply and interface on A620 versions



Note : When using versions provided without power supply, please ensure that the adapter provides the correct operating voltage and current (see chapter "Power Supply Specifications").

2.2.2. Installing the battery and connecting the interface on A621 versions

The battery is set underneath the printer as shown here after.
The battery is clipped to the printer, push to clip, pull to unclip.
Do not force to much as you may try to insert the battery in the wrong direction, in this case a locating pin will avoid clipping, turn your battery and try again.



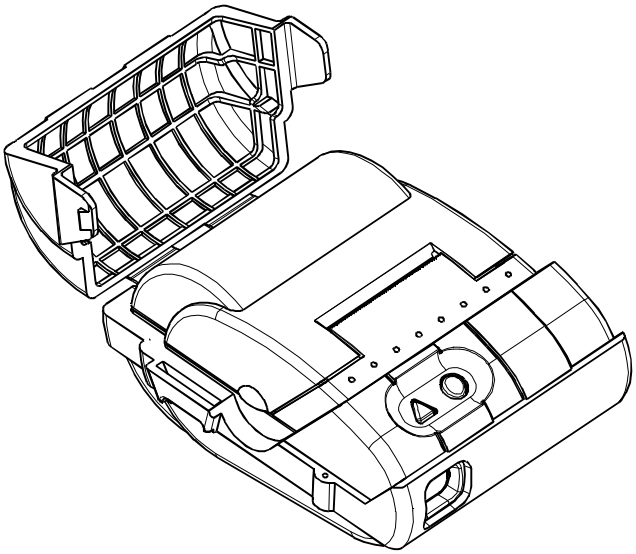
Set your interface cable at the rear of the printer to the connector shown here after.

Note : To load the battery set your power supply to the connector shown on A620 version (page 4)
The printer can be operated during the loading process only when the battery is loaded enough.

2.3. OPTIONAL RUBER BOO T

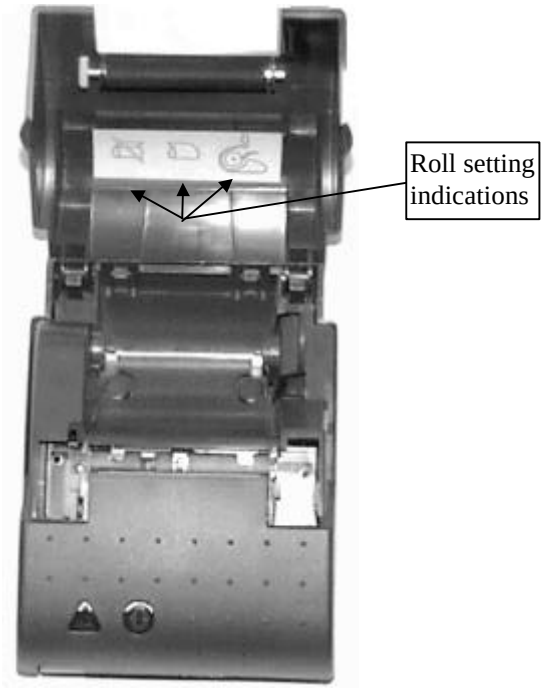
An optional rubber boot can be added to protect your printer for portable applications (A621).

This protection is designed to be easily attached to the user belt.



2.4. LOADING PAPER

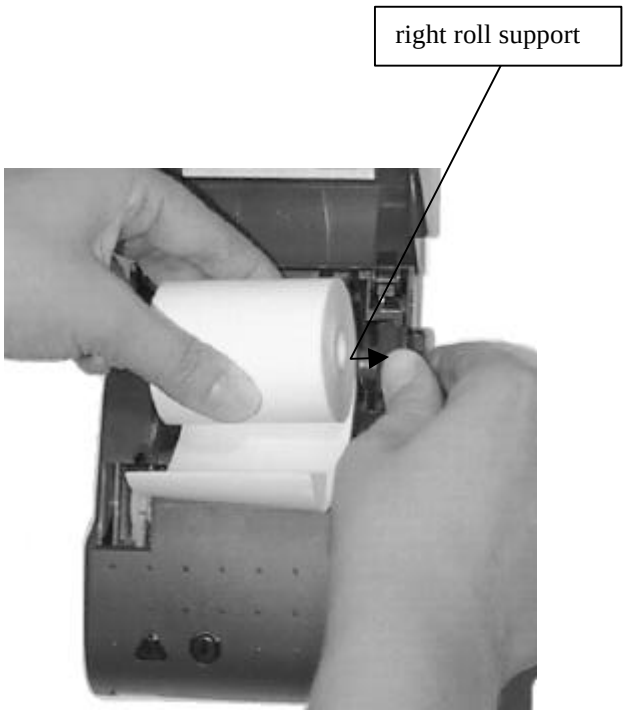
The Clamshell design allows easy paper loading.



To load paper :

Follow the steps given and illustrated here after :

- Open the cover using finger recesses.
- Set the paper roll as indicated on the picture below by pushing aside the right roll support.
- Close the cover leaving a small length of paper out.
- Cut the small length left with the tear bar.
  Your paper roll is set.



Note 1 : Do not remove paper by pulling excessive lengths through the top of the printer.
Note 2 : PAPER MUST NOT BE STUCK TO THE CORE

2.4.1. Paper Specifications

The paper used should be recommended by AXIOHM (Recommended paper : JUJO AF50KS-E3)
The paper width must be 57 to 58 mm
The maximum paper roll diameter is 55 mm
Standard paper thickness 65 microns

2.5. TROUBLESHOOTING

2.5.1. Light indicators on A620 (desktop)

When the printer is powered the "off " button is lighted (colour red), the printer is in stand-by mode.

When the printer is set "on", the "on" button is lighted (colour green), the "off" button is still lighted, the printer can receive data and print.

2.5.2. Problems & Solutions on A620

Lights are "off " when powered	Check the power supply and cables connections.
Lights are continuously "on " but printer does not operate	Check to see if the interface cable is well connected.
The green light is flashing	Check that cover is well closed, if not close it. Open the cover and make sure there is paper left in the printer, if not : remove the paper roll core, place a new paper roll. Open the cover and check there is no paper jam, if there is some : unwind the paper untill no wrinkle appears, close the cover with wrinkled part out and cut it with the tear bar.
Printing quality is deteriorating	The printhead may be getting dirty, see next chapter.

2.5.3. Light indicators on A621 (portable)

When the printer is powered by installing the battery, none of the button is lighted.

When the printer is set "on", the "on" button is lighted (colour green), the "off" button is not lighted, the printer can receive data and print.

When loading the battery, the "off" button (colour red) is lighted. In this case the printer can be used only if the battery is loaded enough as previously mentioned.

2.5.4. Problems & Solutions on A621

The green light is continuously "on " but printer does not operate	Check to see if the interface cable is well connected.
The green light is flashing	Same solution as for A620 version described above
Printing quality is deteriorating	The printhead may be getting dirty, see next chapter.
Very low printing speed and very low printing density.	The battery needs to be re-powered.

2.5.5. Further details to solve eventual problems

(1) The paper is not feeding properly.
If the print looks squashed, check that the paper roll is sitting correctly in the paper well and that the roll is the right way up. The paper should be feeding off the bottom of the roll into the back of the mechanism NOT off the top of the roll. Remove paper and reload if necessary.

(2) The printer does not switch on from the data line.
If the printer does not automatically switch on when the communications channel is active, check that the host is able to send data and the handshaking is disabled. When the printer is off, most host equipment will not be able to send data as the DTR line is inactive. For the switch on procedure, DTR must be disabled, the NUL characters transmitted, then DTR enabled to resume normal communications.

(3) The printer prints "?" "!" or "*" in place of the transmitted characters or it does not action commands.
Check the handshaking line, parity setting and baud-rate. The different characters denote particular errors: "?" - parity error, "!" - framing error, "*" - over run error.

Note 1 : in any case make sure you use thermal sensitive paper and that the paper roll is well set in its bucket. Check that the sensitive layer of the paper is on the print-head side

Note 2 : when resetting the printer, every running operation is stopped and all information sent before resetting are lost.

2.6. PRINT A SELF TEST TICKET

The printer must be powered and some paper must be loaded in order to get the self test.
Follow next instructions to print a self test :

- If the printer is "on" set it "off" by pushing the "off" button.
- activate the ("on" & paper feed) button and keep it pressed.
- wait for the self test ticket to start
- release the button, the self test will run
- press the "off" button to stop the test

The software issue is printed in double height, double width text, followed by the character set in normal text and a list of the current settings of the user selectable options. If the settings are correct for your host you are ready to connect the printer to your system, otherwise you will need to re-programme the printer. The self test is repeated until the power is switched off. Power on again for normal operation.

2.7. CLEANING YOUR PRINTER

Depending on the environment in which the printer is used, it can accumulate dust. Therefore it is necessary to clean it periodically to maintain a good print quality. The cleaning period depends on the environment and the usage of the printer, but the printhead should be cleaned at least once a year or up to one month in case of heavy duty applications.

Cleaning Instructions :

- Unplug the printer. **Never clean the head immediately after printing, the head may be hot.**
- Open the cover, clean the heating dots line of the head with a cotton stick containing a solvent alcohol (ethanol, methanol, or IPA) but **do not touch the printhead with your fingers** !
- Allow the solvent to dry and close the cover.

N.B : AXIOHM can also provide cleaning kits with the instructions to use it. The kit reference is CK60000A.

3. FUNCTION DESCRIPTION FOR PRINTER DRIVING

3.1. Default Settings

A620	A621
Data bits 8	Data bits 8
Parity None	Parity None
Baud Rate 9600	Baud Rate 9600
Country USA	Country USA
Print Mode Text	Print Mode Text
Auto-Off Disabled	**Auto-Off 5 minutes**
Emulation Standard (Compatible DP1000 / DP1200)	Emulation Standard (Compatible DP1000 / DP1200)
DTR Normal	DTR Normal
Chars/Line 24	Chars/Line 24
Graphics Standard	Graphics Standard
Contrast 2	Contrast 2
Label Disabled (Does not exist yet)	Label Disabled (Does not exist yet)

Default settings can be restored by pressing both the feed and programme switches together at power up. Releasing the feed button before the programme button will set original defaults*.

* " Default restored" should be printed on the paper.

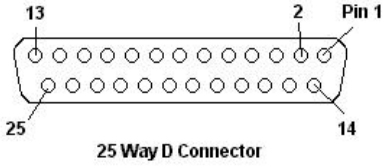
3.2. Interface Connections

The A620 printers are available as standard with RS232 Serial interface.
The interface type is printed on the self-test slip.
The connector is a 25 way D socket for desktop model.
The connector is a Binder 5 for portable model.

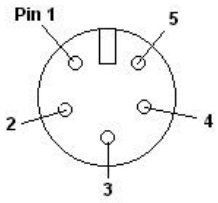
A620 (25 Way D Socket)			**A621 (Binder)**		
Function	Connector Pinout	Input/Output	Function	Connector Pinout	Input/Output
RX	3	IN	RX	3	IN
TX	2	OUT	TX	2	OUT
CTS	5	IN	CTS	5	IN
DTR	20	OUT	DTR	4	OUT
GND	7	-	GND	1	-
NC	6,8-19,21-25	-	NC	-	-
FG	1	-	FG	-	-
RTS	4 (+10V via 1K)	OUT	RTS	-	OUT

3.2.1. PC → Board Connections

A620				A621			
25 Way D Socket		→	**PC**		**Binder**	→	**PC**
Pins :	3	→	3 (TX)	**Pins :**	3	→	3
	2	→	2 (RX)		2	→	2
	5	→	4 (DTR)		5	→	4
	20	→	6 (DSR)		4	→	6
	7	→	5 (GND)		1	→	5



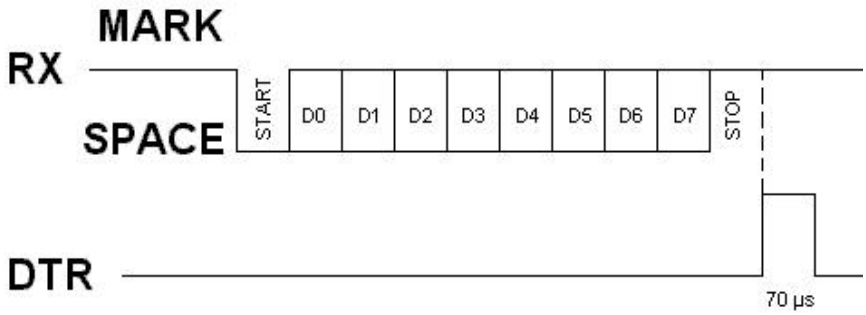
25 Way D Connector



Binder Connector

Ref. 09-9792-30-05-5

3.2.2. Serial interface timing



MARK = - 10 V
SPACE = + 10 V

N.B. : DTR WILL BE SET FOR A MINIMUM OF 70 µs AT THE END OF THE STOP BIT ON EACH CHARACTER.

THIS CONDITION WILL BE LONGER FOR BUFFER FULL AND WILL BE SET UNTIL RESET IF A PRINTER FAULT OCCURS.

3.3. Program Mode

The program switch may be accessed through a small hole on the side of the printer. This can be pressed using a small pin eg a paper clip

3.3.1. How to enter the program mode

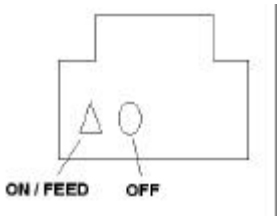
To enter the program mode, press the program switch and the paper feed button together and then release the paper feed button. The program mode starts automatically.

3.3.2. How to move in the program

If you want to validate a parameter, press the paper feed button ; in the other case, if you want to make another selection, press the switch program button.

3.3.3. how to quit and save the program

When all the necessary changes to the parameters have been made, press the programme and the feed switch together to update the status of the printer. If no switches are pressed for 15 seconds the set-up mode is terminated without changing the original parameters.



Parameter (FEED Switch)	Status (PROGRAMME Switch)
(1) Number of data bits	8 bit data ** (** Default Settings) 7 bit data
(2) * Parity	No parity ** Odd parity Even parity
(3) * Baud Rate * NB: Not printed for a parallel interface	300 baud 600 baud 1200 baud 2400 baud 4800 baud 9600 baud ** 19200 baud
(4) Country	USA ** ITALY FRANCE SPAIN GERMANY JAPAN UK NORWAY DENMARK 1 DENMARK 2 SWEDEN
(5) Print Mode	TEXT (Normal Print) DATA (Inverted Print)
(6) Auto POWER OFF	5 minutes ** 1 minute Disabled
(7) Emulation	DP1000 / DP1200 ** Compatible Citizen 560 ESC/POS
(8) DTR	Normal ** Inverted
(9) Characters/Line	24 ** 40
(10) Graphics	Standard ** Compatible Epson High resolution graphics
(11) Contrast	1-10 1 is lightest (2 Default) 10 is darkest

3.4. Automatic Switch On (A621 ONLY)

As a standard mode of operation, the A621 will “wake-up” in response to activity on the data line. To use this power saving facility, the DTR handshaking must be disabled whilst a string of approximately 95 NUL characters (00H) are sent to the printer. This allows time for the logic to reset and initialise the printer correctly. Any NUL characters that are received as valid data from this string will be discarded as non-printable data. Once the start up sequence is complete, reactivate the DTR handshaking so that normal communications can be resumed.

Basic program example :

```
OPEN "COM1:9600,n,8,1,RS,DS0,CS0" FOR OUTPUT AS #1
FOR CHAR = 1 TO 95
PRINT #1, CHR$(0);
NEXT CHAR
CLOSE
OPEN "COM1:9600,n,8,1,RS,DS0,CS0" FOR OUTPUT AS #1
PRINT #1, "A621 Woke up with succes"
```

When used in combination with the auto-off feature, the printer can effectively be switched on when required to print, thus extracting maximum capacity from the battery pack.

4. PROGRAMMING

4.1. Command Summary for the A620 Printer

Function	Keystroke	Hex	Decimal
Command Summary For Emulation compatible with DP1000 and DP1200			
Horizontal Tab	CTRL I	09H	9
Line Feed	CTRL J	0AH	10
Form/Label Feed	CTRL K	0BH	11
Vertical Tab	CTRL L, *n*	0CH, *n*	12,*n*
Carriage Return	CTRL M	0DH	13
Double Width	CTRL N	0EH	14
Single Width	CTRL O	0FH	15
Reset	CTRL Q	11H	17
Underline	CTRL U	15H	21
Underline Release	CTRL X	18H	24
Reverse Print	CTRL Y	19H	25
Double Height	CTRL Z	1AH	26
Standard Graphics	CTRL [, *n*	1BH, *n*	27,*n*
Epson Graphics	CTRL [,K,*n*1,*n*2	1BH,4BH,*n*1,*n*2	27,75,*n*1,*n*2
24 Column	CTRL\	1CH	28
40 Column	CTRL]	1DH	29
Command Summary For Emulation compatible with Citizen 560			
Line Feed	CTRL J	0AH	10
Form Feed	CTRL L	0CH	12
Carriage Return	CTRL M	0DH	13
Shift Out	CTRL N	0EH	14
Shift In	CTRL O	0FH	15
Reverse Print	CTRL T	14H	20
Clear Buffer	CTRL X	18H	24
Graphic Print	ESC K	1BH, 4BH	27,75
Page length/format	ESC C	1BH, 43H*	27,67 *Commands
Paging Is Off	ESC O	1BH, 4FH*	27,79 acknowledged
2.75 mm Spacing	ESC 1	1BH, 31H*	27,49 but not
5.5 mm Spacing	ESC 2	1BH, 32H*	27,50 executed
Double Width	-	1EH	30
Single Width	-	1FH	31

Command Summary For ESC/POS Emulation (compatible with Epson)

Horizontal Tab	CTRL I	09H	9
Line Feed	CTRL J	0AH	10
Form Feed	CTRL L	0CH	12
Carriage Return	CTRL M	0DH	13
Set Print Mode	ESC !,*n*	1BH, 21H, *n*	27,33,*n*
Set print position	ESC $ *n*1,*n*2	1BH, 24H, *n*1,*n*2	27,36,*n*1,*n*2
Set cancel UDC	ESC %,*n*	1BH, 25H, *n*	27,37,*n*
User Defined Character	ESC & *s,n,m, [a[p]sxa]m-n+1*	1BH, 26H, *s,n,m, [a[p]sxa]m-n+1*	27, 38,*s,n,m, [a[p]sxa]m-n+1*
Bit image graphics	ESC**m,n*1,*n*2	1BH, 2AH,*m,n*1,n*2*	27,42,*m,n*1,*n*2
Initialise Printer	ESC @	1BH, 40H	27,64
Set form length	ESC C,*n*	1BH, 43H, *n*	27,67,*n*
Character Set	ESC R,*n*	1BH, 52H, *n*	27,82,*n*
Print & Feed	ESC d,*n*	1BH, 64H, *n*	27,100,*n*
Status Request	ESC v	1BH, 76H	27,118
Inverted Printing	ESC {,*n*	1BH, 7BH, *n*	27,123,*n*
HRI print position	GS,H,*n*	1DH, 48H, *n*	29,72,*n*
HRI character font	GS,f,*n*	1DH, 66H, *n*	29,102,*n*
Bar code height	GS,h *n*	1DH, 68H, *n*	29,104,*n*
Print bar code	GS k *n,d,m*,NUL	1DH, 6BH, *n,d,m*,0H	29,107,*n,d,m*,0
Bar code magnification	GS w,*n*	1DH, 77H, *n*	29,119,*n*

4.2. Command Description for the A620 Printer

09 H

Description Horizontal tab.

Format <09 h>

Comments This command moves the printing position to the next horizontal tab position.
Tab stops occur at every 8th column. On receipt of this command, spaces are entered into the line up to the next tab stop.

Ex : **09** 41 41 41 41 41 41 41 41 41

⇒ _ _ _ _ _ _ _ _AAAAAAAAA

LF

Description Feed one line.

Format <0A h>

Comments This command prints and moves the printing position to the beginning of the next line.
If LF and CR are sent, the CR is ignored to avoid a double feed.

Ex : 41 41 41 41 41 **0A** 41 41 41

⇒ AAAAA
AAA

0B H

Description Form feed.

Format <0A h>

Comments This command Will feed 5 fast line feeds in normal mode or will feed to top of label registration mark in label mode.

0C H n

Description Vertical Tab.

Format <0C h> <n>

Comments This command fast feeds the paper by *n* lines where *n* is a single byte hex number in the range $0 < n < 63$.
Note that a vertical tab will print the contents of the line buffer before being executed.

0D H

Description Carriage return.

Format <0D h>

Comments This command prints the current line and feeds one line. If CR and LF are sent, the LF is ignored to avoid a double feed.
On the receipt of the last printable character, the printer will automatically print the data in the buffer. If CR and LF are sent after this condition, they will be ignored.

0E H

Description Double width.

Format <0E h>

Comments This command Turns double width printing on. This state continues until terminated by the single width command or completion of the current line.
If the last character in the line buffer is double width but there is only room for a single width character, then it will be printed in single width.

Ex : 41 41 41 41 **0E** 41 41 41 41

⇒ AAAA ⇒ AAAA

0F H

Description Single width.

Format <0F h>

Comments This command reverts to single width printing. Single and double width can be combined anywhere on a line.

Ex : 0E 41 41 41 41 **0F** 41 41 41 41

⇒ AAAA ⇒ AAAA

11 H

Description Reset.

Format <11 h>

Comments This command causes printer status reset. Printer status is set to single width, normal height, no underline. Note that the buffer remains unaltered to avoid any data loss.

15 H

Description Underline ON.

Format <15 h>

Comments Characters sent after this command will be underlined. Tabs are not underlined. Underlining is terminated by the U/L release command or on completion of the current line.

Ex : 41 41 41 41 **15** 41 41 41 41

⇒ AAAA ⇒ AAAA

18 H

Description Underline OFF.

Format <18 h>

Comments This command Terminates underlining.

Ex : 15 41 41 41 41 **18** 41 41 41 41

⇒ AAAA ⇒ AAAA

19 H

Description Reverse Print.

Format <19 h>

Comments This command sets the print to white on black. The command will toggle between reverse and normal print wherever it appears on a line, but the condition is always reset at the end of the line.

Ex : 41 41 41 **19** 41 41 41

⇒ AAA ⇒ AAA

1A H

Description Double Height.

Format <1A h>

Comments This command Prints the line in double height for one line only. Double height and single height cannot be mixed on the same line.

1B H n

Description Standard graphics.

Format <1B h> <n>

Comments **Standard 1000 Emulation**
Graphics command to enter bit image printing. The number of graphic bytes sent will depend on the column selection ie 24 or 40. For each graphic byte sent, 6 bits out of the 8 bits are used to build the graphics string (LSB as the right most dot) and '*n*' is the number of times the string will be repeated for a repetitive pattern. The value of '*n*' is limited to a maximum of 255 lines. The print buffer will be printed first if not empty.

Examples:

To repeat a string of data bytes, d1....d24 over two rows for 24 column printing send : 1BH, 02H, d1....d24.
For a non-repeated string send : 1BH, 01H, d1....d24.

High Resolution Graphics
To make use of the higher resolution on the DP1200 that is not available on the 1000, there is an option in the set up for changing the default graphics. This works in the same manner as the standard emulation but there are 48 characters across the line, rather than 24 or 40. This provides full dot addressable graphics at 8 dots/mm and a true image of the data received.

1C H

Description 24 Columns Font.

Format <1B h>

Comments This command **s**elects 24 column font. ie Sets 24 characters per line printing.

1D H

Description 40 Columns Font.

Format <1D h>

Comments This command **s**elects 40 column font. ie Sets 40 characters per line printing.

ESC K n1 n2

Description Graphics compatible with Epson.

Format <1B h> <4B h> <n1> <n2>

Comments This command Made possible by the higher resolution and memory capability of the DP1200 over the standard 1000. The number of graphic bytes is determined by *n*1 (low order byte) and *n*2 (high order byte). For maximum graphics resolution of 384 printable positions, *n*1=128 and *n*2=1 (representing 256). For 200 graphic bytes, *n*1=200, *n*2=0. That is $0<n1<255$, $0<n2<1$.

Each data character represents 8 dot rows of graphics, the LSB being the lowest dot.
The command and data must be sent for each line of graphics.

4.3. ESC/POS Command Description

09 H

Description Horizontal tab.

Format <09 h>

Comments This command moves the printing position to the next horizontal tab position.
Tab stops occur at every 8th column. On receipt of this command, spaces are entered into the line up to the next tab stop.

Ex : **09** 41 41 41 41 41 41 41 41 41

⇒ _ _ _ _ _ _ _ _AAAAAAAAA

LF

Description Feed one line.

Format <0A h>

Comments This command prints and moves the printing position to the beginning of the next line.
If LF and CR are sent, the CR is ignored to avoid a double feed.

Ex : 41 41 41 41 41 **0A** 41 41 41

⇒ AAAAA
AAA

0C H

Description Form Feed.

Format <0C h>

Comments This command prints the current line and feeds the number of lines determined by using the ESC C command..

0D H

Description Form Feed.

Format <0D h>

Comments This command prints the current line and feeds one line. If CR and LF are sent, the LF is ignored to avoid a double feed.

ESC ! n

Description Set print mode.

Format <1B h> <21 h> <n>

Comments This command sets the print mode according to the following table and *n* is a single byte in which each bit sets the printing function. Note that underlines cannot be used with a horizontal tab and any combination of double height and width can be used. Double and single height cannot be mixed on a line, however, whereas double and single width can be mixed anywhere on a line.
Default is *n* = 0.

Bit	Function	Value	
		0	1
0	Character Font	16 x 24	9 x 24
1	Undefined	-	-
2	Undefined	-	-
3	Undefined	-	-
4	Double-height	Cancelled	Set
5	Double-width	Cancelled	Set
6	Undefined	-	-
7	Underline	Cancelled	Set

ESC % n

Description Set / Cancel user defined character set.

Format <1B h> <25 h> <n>

Comments The range of n is 0 < n < 255. This sets or cancels the user defined character set.
Note: Once the user defined character set has been cancelled the default character set will be loaded and the user defined characters will be lost.

ESC & s n m Data

Description Define user defined characters.

Format <1B h> <26 h> <s> <n> <m> ***[a[p] s x a]m-n+1***

Comments This allows the user-defined characters to be down-loaded:
where:

- "*s*" specifies the number of bytes in the vertical direction. This value must be 3.
- "*n*" specifies the beginning ASCII code for the definition and "m" the final code. If only one character is defined, use *n* = *m*. The range for *n* is 32 < *n* < *m* < 255.
- "*a*" specifies the number of dots in the horizontal direction. This value must be 16.
- "*p*" is the dot data for the characters. The dot pattern for *a* dots in the horizontal direction from the left side.
  The amount of data to be defined is *s* x *a*.
- After user-defined characters are defined once, they are available until another definition is made or ESC % *n* is sent.

NOTE: See Ch "character cell structure".
The User defined character set (UDCS) and the standard character set are not available at the same time. Normally, the UDCS will be battery backed. However, if the batteries are left to discharge completely, then the UDCS will be lost and the default character set will be loaded.

ESC @

Description Initialise printer.

Format <1B h> <40 h>

Comments This command initialise printer. Clears the print buffer and resets the printer mode to default values.

ESC R n

Description Select International character set.

Format <1B h> <52 h> <n>

Comments The character set from the following table is determined by the value of *n*. The default value is the character set programmed in the printer.

n	Country
0	U.S.A.
1	France
2	Germany
3	U.K.
4	Denmark 1
5	Sweden
6	Italy
7	Spain
8	Japan
9	Norway
10	Denmark 2

ESC d n

Description Print and feed.

Format <1B h> <64 h> <n>

Comments This command prints the data in the print buffer and performs *n* line feeds.

ESC v

Description Status request.

Format <1B h> <76 h>

Comments The current printer status is transmitted to the host computer on receipt of this command. It takes the form of a single byte with each bit representing a specific printer condition. The conditions indicated are “true” when the bit is a logic “1".

Bit 0	Paper out
1	Feeding paper
2	Lid open
3	Low voltage
4	Always zero
5	Not used
6	Not used
7	Buffer full

The byte is sent regardless of the CTS handshaking signal.

ESC { n

Description Inverted print.

Format <1B h> <7B h> <n>

Comments When *n* = 1 then print is inverted and text will be printed from right to left. For normal print *n* = 0. The default mode is set by the programmed parameters in the printer.

ESC C n

Description Set form lenght.

Format <1B h> <43 h> <n>

Comments When used in conjunction with the form feed command (0CH), the printer will feed *n* lines. Note that if *n* = 0 then there will be no line feeds. The default value is *n* = 0.

ESC $ n1 n2

Description Print starting position.

Format <1B h> <24 h> <n1> <n2>

Comments This command sets the print starting position to the specified number of dots from the margin. The range is from 0 to 384 where *n*2 is the high order byte (0˜*n*2 ˜1) and *n*1 is the low order byte (0˜n1˜255). The default condition is *n*1=*n*2=0 which positions print on the left margin. The print position will always be rounded down to the nearest multiple of 8. (eg Print position 45 will be rounded down to 40.)

GS k n d m Nul

Description Bar codes / Set bar code types.

Format <1D h> <6B h> <n> <d> <m> <00 h>

Comments The print bar code command selects a bar code, formats the data and prints the bar code according to the variables *n*, *d* and *m*. The type of bar code is defined by "*n*" and valid values are displayed in the table below.

n	Bar code types
0	UPC-A
1	UPC-E
2	EAN13
3	EAN8
4	CODE39
5	ITF
6	NOT ASSIGNED
7	CODE128

d is the string of characters to be printed as the bar code.
m specifies the number of characters sent. This must be sent for code128 bar codes but is optional for the others.

This command will always set the print position to that specified by the ESC $ (print position) command. Certain error conditions result in data being ignored and nothing being printed, these conditions are:

- invalid bar code type
- invalid characters (*d*) in bar code
- too many/few characters sent (UPC and EAN bar codes)
- number of characters sent is not equal to *m*
- bar code is wider than paper

Check characters can be sent but are overwritten by the calculated check character and are therefore redundant.

GS w n

Description Set bar code magnification.

Format <1D h> <77 h> <n>

Comments This command selects magnification (horizontal size) of the bar code. The range is 2< *n*<4. The default value is *n*=3.

GS h n

Description Set bar code height.

Format <1D h> <68 h> <n>

Comments The range is 1<*n*<255 and *n* specifies the number of dots in the bar code height. Default value is *n*=162. Note that if *n*=0, the default height is used.

GS H n

Description Set HRI print position.

Format <1D h> <48 h> <n>

Comments The range is 0<*n*<3. The default value is *n*=0 and "*n*" defines the print position as follows:

n=0 not printed
n=1 above the bar code
n=2 below the bar code
n=3 above and below the bar code

Guard patterns are not printed in the HRI text.

GS f n

Description Select HRI font.

Format <1D h> <66 h> <n>

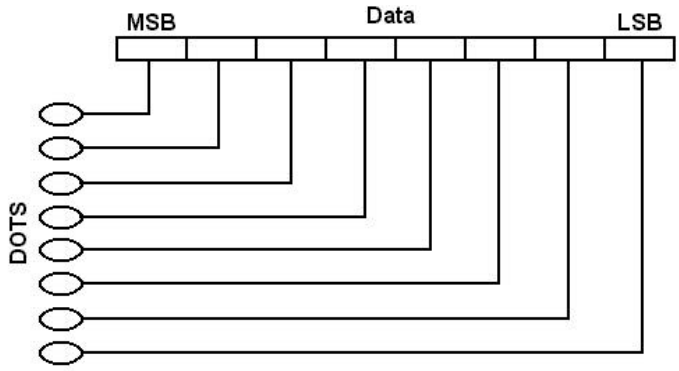
Comments The range is *n*=0 or 1 (default 0). If *n*=0, the 24 column font is selected.
If *n*=1, the 40 column font is selected.

ESC * m n1 n2 d

Description Graphics.

Format <1B h> <2A h> <m> <n1> <n2> <d>

Comments The bit image graphics command formats and prints a bit image depending on *m*, *n*1, *n*2 and the data. The density of bit image (m) has no effect on the DP1200. All graphics are single density, but ordinarily m = 0 for single and m = 1 for double density.
n1, and n2 specify the number of of bytes sent (d).
n2 is the high order byte (0 £ *n*2 £ 1), n1 is the low order byte (0 £ *n*1 £ 255). The total number of data bits to send is calculated by the formula *n*2 x 256 + *n*1. For 384 graphic bytes, the maximum per line, then *n*2=1, *n*1=128. The data (d) is formatted as shown below.



4.4. Command Description for the A620 Printer with Emulation compatible with Citizen 560

0A H

Description Line feed

Format <0A h>

Comments This command prints the current line and feeds one line. If LF and CR are sent, the CR is ignored to avoid a double feed.

0C H

Description Form feed

Format <0C h>

Comments This command will feed 4 fast line feeds.

0D H

Description Carriage return

Format <0D h>

Comments This command prints the current line and feeds one line. If CR and LF are sent, the LF is ignored to avoid a double feed.

On the receipt of the last printable character (eg 24th, if characters per line is set to 24) the printer will automatically print the data in the buffer. If CR and LF are sent after this condition, they will be ignored.

0E H

Description Shift OUT

Format <0E h>

Comments This command access upper half of character set if 7 data bits selected. If 8 data bits selected, then turn DOUBLE WIDTH printing on.

0F H

Description Shift IN

Format <0E h>

Comments This command access lower half of character set if 7 data bits selected. If 8 data bits selected, then turn SINGLE WIDTH printing on.

14 H

Description Reverse print

Format <14 h>

Comments This command sets the print to white on black. The command will toggle between reverse and normal print wherever it appears on a line but the condition is always reset at the end of the line.

18 H

Description Clear buffer

Format <18 h>

Comments This command clears the print data in the buffer. All the previous input data is cleared with this code. However, in case of graphic print mode, this code is treated as data.

1E H

Description Double width

Format <1E h>

Comments This command turns double width printing on. This state continues until terminated by the single width command or completion of the current line.
If the last character in the line buffer is double width, but there is only room for a single width character, then it will be printed in single width.

1F H

Description Single width

Format <1F h>

Comments This command reverts to single width printing. Single and double width can be combined anywhere on a line.

ESC K n1 n2 H

Description Graphics command (Compatible with Citizen 560)

Format <1B h> <4B h> <n1> <n2>

Comments This command requires special note because all associated data will be ignored. The number of graphics bytes determined by *n*1 and *n*2, will be received but discarded so as not to appear as erroneous text. Note that *n*1 can only be up to 240 and *n*2 will be read as zero as the 560 only allows printing of 240 graphics bytes. If more than 240 graphics characters are sent, then the balance will be interpreted as non-graphic data.

5. STANDARD AND INTERNATIONAL CHARACTER SET

5.1. Standard

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0			SP	0	@	P	`	p	Ç	É	á	!	.	J	α	≡
1			!	1	A	Q	a	q	ü	æ	í	"	2	L	β	±
2			"	2	B	R	b	r	é	Æ	ó	#	0	H	Γ	≥
3			#	3	C	S	c	s	â	ô	ú	*	/	F	π	≤
4		DC4	$	4	D	T	d	t	ä	ö	ñ	l	)	B	Σ	⌠
5			%	5	E	U	e	u	à	ò	Ñ	|	3	?	σ	⌡
6			&	6	F	V	f	v	å	û	o	M	G	C	µ	÷
7			'	7	G	W	g	w	ç	ù	°	D	K	O	τ	≈
8			(	8	H	X	h	x	ê	ÿ	¿	@	9	P	Φ	°
9		CAN	)	9	I	Y	i	y	ë	Ö	¬	<	6	-	Θ	•
A	LF		*	:	J	Z	j	z	è	Ü	¬	5	=	+	Ω	.
B		ESC	+	;	K	[	k	{	ï	¢	½	7	;	$	δ	√
C	FF		,	<	L	\	l	|	î	£	¼	8	:	(	∞	6
D	CR		-	=	M	]	m	}	ì	¥	¡	E	4	%	ϕ	²
E	SO		.	>	N	^	n	~	Ä	.	«	A	>	'	∈	#
F			/	?	O	_	o	◊	Å	*f*	»	,	N	&	∩	SP

SP indicates a space character. Blank locations indicate unused codes.

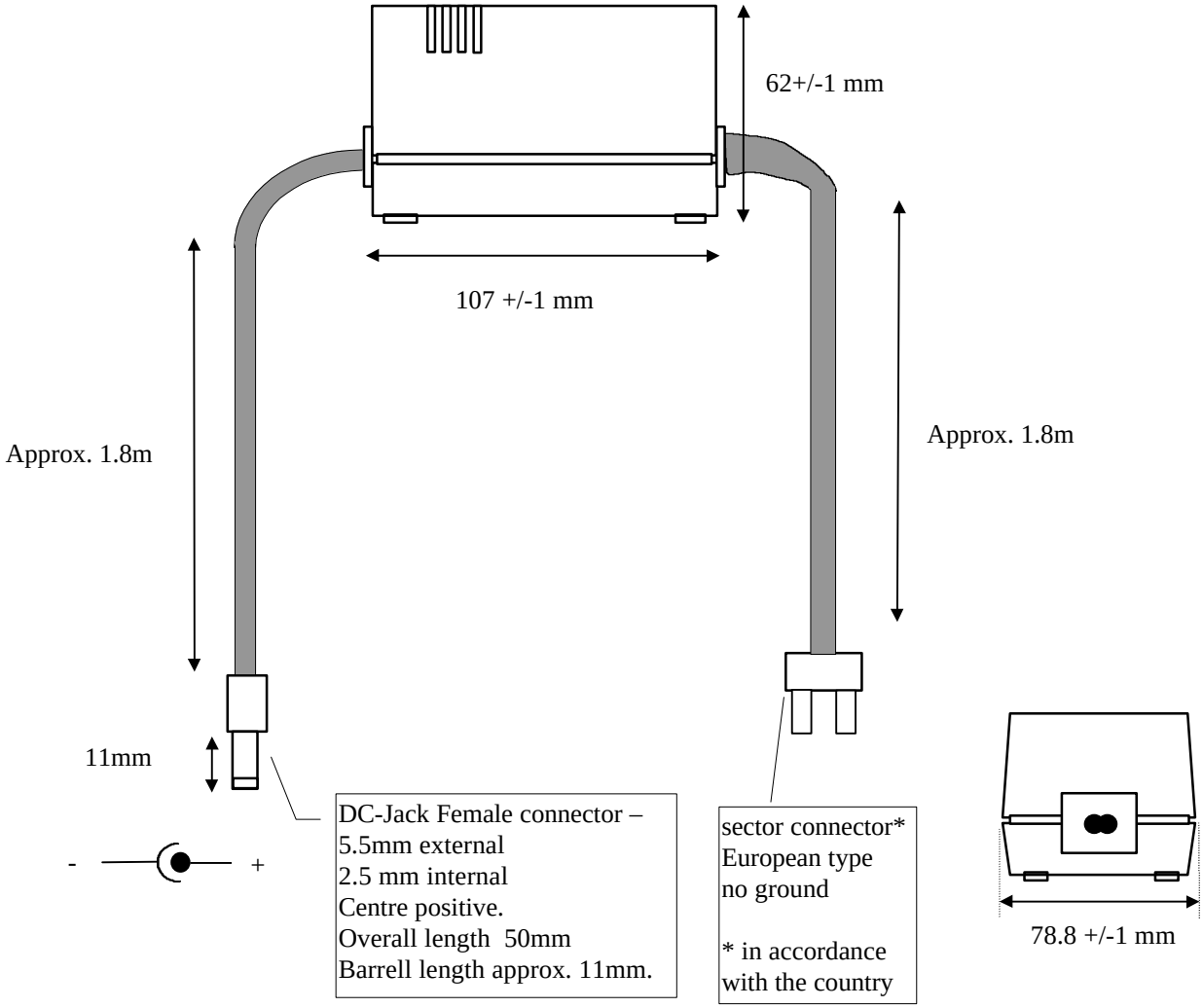
5.2. International

	n	35_D 23_H	36_D 24_H	64_D 40_H	91_D $5B_H$	92_D $5C_H$	93_D $5D_H$	94_D $5E_H$	96_D 60_H	123_D $7B_H$	124_D $7C_H$	125_D $7D_H$	126_D $7E_H$
U.S.A.	**0**	#	$	@	[	\	]	^	`	{	|	}	~
France	**1**	#	$	à	°	ç	§	^	`	é	ù	è	"
Germany	**2**	#	$	§	□	Ö	Ü	^	`	ä	ö	ü	ß
U.K.	**3**	£	$	@	[	\	]	^	`	{	|	}	~
Denmark 1	**4**	#	$	@	Æ	Ø	Å	^	`	æ	ø	å	~
Sweden	**5**	#	¤	□	Ä	Ö	Å	Ü	é	ä	ö	å	ü
Italy	**6**	#	$	@	°	\	é	^	ù	ä	ò	è	i
Spain	**7**	.	$	@	i	Ñ	¿	^	`	"	ñ	}	~
Japan	**8**	#	$	@	[	¥	]	^	`	{	|	}	~
Norway	**9**	#	¤	□	Æ	Ø	Å	Ü	é	æ	ø	å	ü
Denmark 2	**10**	#	$	□	Æ	Ø	Å	Ü	é	æ	ø	å	ü

6. POWER SUPPLY SPECIFICATIONS

6.1. Without Battery Pack

6.1.1. European Power supply



Remark : power supply 23.4VA

- **INPUT** : 230 VAC 50Hz
- **OUTPUT** : 9VDC 2600mA

CE Mark

6.1.2. US Power Supply

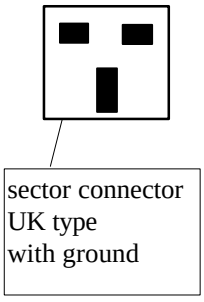
Remark : power supply 27 VA

- **INPUT** : 120 VAC 60Hz 45 w
- **OUTPUT** : 9VDC 3000mA

MARQUAGE **UL, CSA**

6.1.3. UK Power supply

The Power supply is the same than the European one. Only the power sector cable changes with a different connector.



6.2. With Battery Pack

6.2.1. Duracell DR10 Specifications

Nickel-Metal Hybride Rechargeables.

Nominal Voltage	6.0 V
Rated Capacity	1800 mAh at C/5 to 5.0 V 21 °C (70°F)
Average Weight	182 g (6.4 oz.)
Maximum Volume	78 cm^3 (4.8 in^3)
Terminals	Flat
Operating Temperature Range	-20 °C to +50 °C (-4 °F to 122 °F)

CHARGING

Optimum dischargeable capacity may be achieved using a three stage charge regime :

Rate	Current (mA)	Purpose	Termination	Temperature range
C	1800	Main charge	dT/dt = 1°C/min	10°C to 45°C
Followed by				
C/10	150	Top-up charge	Timed 0.5 hour	0°C to 45°C
Followed by				
C/300	5	Charge maintenance	None required	-20°C to 50°C

6.2.2. Gold Peak GP VD151 specifications

Model N°	VD 151
Battery type	Nickel Metal Hybride
For use with	Sony NP-55/66/77
Color	Black
Nominal voltage	6.0 V
Cut off voltage	5.0 V
Capacity	1700 mAh at 0.2 °C **
Continuous operating time*	45 Minutes (estimated)
Temperature range	Charge : 0 – 45 °C Discharge : -20 – 50 °C Storage : -20 – 50 °C
Casing material	ABS
Typical weight	165 g
Charging	Battery should be charged in a GP or an original Manufacturer charger First charge rate : 0.1 °C Subsequent charge rate : 0.1 °C – 1°C
Safety	Each battery is equipped with a thermostat and thermistor to protect battery from high temperature or short circuit. Each cell is also equipped with a safety event system in case abuses occur.
Warranty	6 months limited warranty from data of purchases.

* data valid only when the battery pack is on fully charged condition

** Battery pack should be firstly charged and discharged for 3 complete cycles as a warm-up.
The pack should then be charged at 0.1 °C and it's capacity be measured by discharging at 0.2 °C.

7. BARCODES SPECIFICATIONS

UPC-A, UPC-E, EAN13 and EAN8
These bar code types only accept numeric characters and require a specified number of characters.

UPC-A, 12 (including check character)
UPC-E, 6 (no check character)
EAN13, 13 (including check character)
EAN8, 8 (including check character)

The bar code has right and left guard patterns which are automatically generated. UPC-A and EAN13 are split into two halves with an automatically generated centre guard pattern. It is not necessary to send a check character as this is automatically calculated.

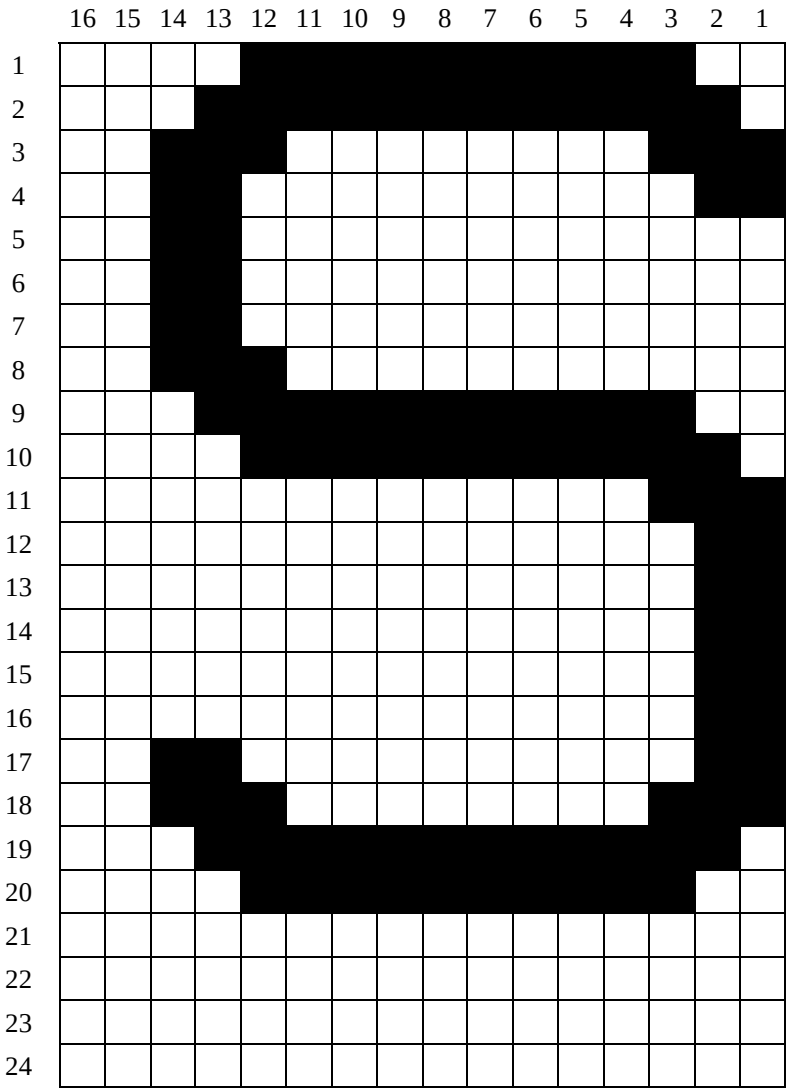
CODE39
This bar code type will accept any uppercase alphanumeric characters plus - . * $ / + % and the space character. Code39 uses start and stop characters which are * characters and are automatically inserted.

ITF
ITF accepts only numeric characters which are encoded in pairs. If an odd number of characters are received, a 0 is inserted at the start of the bar code. Start and stop characters are inserted automatically.

CODE128
Subsets A, B and C are supported. Subset A includes all uppercase alphanumeric characters and control codes, subset B includes all alphanumeric characters and subset C uses digit pairs.

Start and stop patterns are generated by the printer and the subset is selected automatically unless forced into a particular set. The check character is generated automatically. For those characters that are non-printable and therefore not normally accessible, special codes have been designated using “>”. Characters at the top of the table providing functions from “DEL” through to “FNC1" are addressed by commands “>1" to “>8" inclusive.

8. CHARACTER CELL STRUCTURE



P1 = 00H
P2 = 00H
P3 = 00H
P4 = 00H
P5 = 00H
P6 = 00H
P7 = 3FH
P8 = 00H
P9 = C0H
P10 = 7FH
P11 = 80H
P12 = E0H

Organisation of a user-defined character cell